

REMARKS

Reconsideration and further examination of the present application is respectfully requested. Applicants have amended and replaced Figures 1-6. The Office Action has rejected claims 1-20. Applicants have amended claims 2-6 and 8.

Drawings

Figures 1, 3A, 3B, 4A, 4B, and 5A were objected to by the Office Action.

Figure 1 was objected to as being prior art. Figure 1 has been amended to designate it as prior art.

Figures 3A and 3B were objected to because reference number 350 was not in the specification. Applicants have amended paragraphs 32 and 34 to correct this typographical error. Accordingly, these paragraphs now correctly reference number 350.

Figures 4A and 4B were objected to because reference numbers 450, 460, 484, 488, 436, 438, 424, and 428 were not in the specification. Applicants respectfully submit that paragraph 35 has been amended to correctly reference 424, 428, 484, and 488. Applicants respectfully submit that paragraph 37 has been amended to correctly reference 450 and 460. Applicants respectfully submit that 438 may be found in paragraph 37 without the need for any corrections.

Figure 5 was objected to because reference numbers 530, 580, 590, 554, and 558 were not in the specification. Applicants respectfully submit that reference numbers 580, 590, 554, and 558 may be found in paragraph 39. Applicants also respectfully submit that reference number 530 may be found in paragraph 41. No amendments have been made to paragraphs 39 and 41.

No new material has been added by any of the above amendments.

Specification

Paragraph 34 was objected to because “recovery unit 360” did not correspond to the recovery unit of Figure 3B. Paragraph 34 has been amended such that the recovery unit 350 of Figure 3B is properly noted.

Paragraphs 36 and 37 were objected to because reference numbers 430 and 434 were not found in the figures. Figures 4A and 4B have been amended to include reference number 430. Applicants respectfully submit that Figures 4A and 4B contained reference number 434 and required no amendment.

Paragraphs 38, 39, 40, and 41 were objected to because reference numbers 504, 508, and 580 were not found in the figures. Applicants respectfully submit that Figure 5 contained reference numbers 504, 508, and 580. No amendments were required regarding these reference numbers and paragraphs.

No new material has been added by any of the above amendments.

35 USC § 112

Claims 2-6 and 8 were rejected under 35 USC § 112, paragraph 2. Claim 2 was rejected as having insufficient antecedent basis for the limitations “the master execution core” and “the slave execution core.” Applicants respectfully submit that amended claim 2 overcomes these rejections.

Claims 3 and 6 were rejected as being dependent upon claim 2 and including the same limitations therein. Applicants respectfully submit that the amendments to claims 2, 3, and 6 overcome these rejections and that the amendments to claims 2, 3, and 6 are non-narrowing.

Claim 5 was rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully submit that amended claim 5 overcomes this rejection and that the amendment to claim 5 is non-narrowing as the amendment was inherent in the type of buffer used.

Claim 8 was rejected as having insufficient antecedent basis for the limitation “the recovery routine.” Applicants respectfully submit that amended claim 8 overcomes this rejection and that the amendment is non-narrowing and made to fix antecedent basis.

35 USC § 103

The Office Action has rejected claims 1-20 under 35 USC § 103(a) as being unpatentable over Grochowski et al., US Patent No. 6,615,366B1 (hereinafter ‘366) further in view of Grochowski et al., US Patent No. 6,625,756 (hereinafter ‘756).

‘366 discloses “a processor ... having dual execution cores that may be switched between high reliability and high performance execution modes dynamically, according to the type of code segment to be executed. When the processor is in high performance mode, the dual execution cores operate in lock step on identical instructions, and the execution results generated by each execution core are compared to detect any errors.” (Abstract.)

'756 discloses "a processor ... that implements a replay mechanism to recover from soft errors. The processor includes a protected execution unit, a check unit to detect errors in results generated by the protected execution unit, and a replay unit to track selected instructions issued to the protected execution unit. When the check unit detects an error, it triggers the replay unit to reissue the selected instructions to the protected execution unit." (Abstract.)

With respect to claims 1, 9, and 17, Applicants respectfully submit that the combination of '366 and '756 does not teach or suggest what Applicants are claiming. Specifically, Applicants submit that the combination of '366 and '756 does not teach or suggest the limitation "a timer to trigger an FRC recovery routine if the status indicates the results do not match and the error check unit does not assert the signal within a specified interval." Neither reference discloses the use of a timer for anything.

The Office Action states that '366 does not disclose the use of a "timer to trigger an FRC recovery routine if the status indicates the results do not match." (See Office Action, page 8.) The Office Action asserts that '756 does disclose this in its replay mechanism. The replay unit of '756 may track selected instructions that are in-flight in a protected execution unit and reissue instructions upon the detection of a soft error. ('756, Col. 3, lines 31-35.) In one embodiment, the replay unit is used to re-execute instructions beginning with the instruction for which the soft error was first detected. ('756, Col. 4, lines 17-19.) This is done to make sure that corrupted data is not used in the re-execution of the instruction. An instruction is simply tracked until it is retired as once the instruction is retired the processor state is different and may result in corrupt data being re-executed. ('756, Col. 4, lines 5-27.) This is not the equivalent of using a timer to trigger FRC recovery.

Accordingly neither reference alone, or in combination, teach what Applicants are claiming.

As claims 2-8, 10-16, and 18-20 are dependent on claims 1, 9, and 17 respectively, they are allowable for at least the same rationale.

Conclusion

In view of the foregoing remarks and amendments, it is respectfully submitted that the present application is in condition for allowance.

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Invitation for a telephone interview

The Examiner is invited to call the undersigned at 408-720-8300 if there remains any issue with allowance of this case.


Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

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Amendments to the Drawings:

The attached sheets of drawings include changes to Figures 1-6. These sheets replace the original Figures 1-6.

Attachments: Replacement Sheets